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J. W. L. GLAISHER, M.A., F.R.S., President, in the Chair.

William Edgar Butcher, H.M.S. *Superb*, Mediterranean Squadron;

J. D. McClure, B.A., 71 Jesus Lane, Cambridge; and

Charles Ridley Smith, 44 Lower Belgrave Street, Eaton Square, S.W.;

were balloted for and duly elected Fellows of the Society.

Comparisons of certain Southern Star Catalogues.

By A. M. W. Downing, M.A.

Finding that I had amongst my papers complete comparisons (*i.e.* giving Δa_a, Δa_δ, $\Delta \delta_a$, and $\Delta \delta_\delta$) of the following Star Catalogues:—

I. The Cape Catalogues for 1840 and 1850,
II. The Cape Catalogues for 1840 and 1860,
III. The Cape Catalogues for 1850 and 1880,
IV. The Cape Catalogue for 1860 and the Melbourne Catalogue for 1870,
V. The Melbourne Catalogue for 1870 and the Cape Catalogue for 1880,

it occurred to me that, as only some of these comparisons had been published, from time to time, as opportunity offered, it would be desirable to publish the remainder, in order to avoid the risk of loss which a further postponement of publication might entail. I accordingly now take the liberty of offering them to the Society, not because they are of any special interest at the present time, but with the hope that they may be of use

to astronomers engaged on researches demanding a knowledge of the systematic discordances of the Star Catalogues above-mentioned.

I. *The Cape Catalogues for* 1840 *and* 1850.

The comparison in Right Ascension when the stars are arranged in order of N.P.D. is given in *Monthly Notices*, vol. xlv. pp. 299, 300. To find the discordances in R.A. depending on R.A., the differences have been arranged in order of R.A., and combined in groups extending each over one hour of R.A., and thus the following mean differences found:—

R.A.	Mean $\Delta\alpha$ 1840–1850.	Number of Stars.	R.A.	Mean $\Delta\alpha$ 1840–1850.	Number of Stars.
h h	s		h h	s	
0–1	−0·160	45	12–13	−0·029	37
1–2	−0·127	46	13–14	−0·004	50
2–3	−0·154	52	14–15	−0·009	36
3–4	−0·087	49	15–16	−0·009	64
4–5	−0·054	50	16–17	−0.060	65
5–6	−0·041	40	17–18	−0·010	62
6–7	−0·070	73	18–19	+0·010	52
7–8	−0·040	71	19–20	−0·062	34
8–9	+0·027	49	20–21	+0·017	29
9–10	+0·066	40	21–22	−0·023	32
10–11	+0·062	18	22–23	−0·040	31
11–12	+0·058	38	23–24	−0·054	33

By drawing a curve representing these mean differences in the usual way, and reading off from it for the beginning of each hour (noting that the mean of the groups of differences in R.A. arranged in order of N.P.D. given in the paper referred to above is $-0^{s}\cdot037$, and applying this with opposite sign to each $\Delta\alpha$) we have the final table of differences in R.A. depending on R.A.

R.A.	$\Delta\alpha_{\alpha}$ (1840–1850).	R.A.	$\Delta\alpha_{\alpha}$ (1840–1850).
h	s	h	s
0·0	−0·066	12·0	+0·054
1·0	−0·096	13·0	+0·031
2·0	−0·100	14·0	+0·025
3·0	−0·078	15·0	+0·018
4·0	−0·039	16·0	+0·009
5·0	−0·021	17·0	+0·008
6·0	−0·013	18·0	+0·019
7·0	−0·002	19·0	+0·021

R.A. h	$\Delta\alpha_a$ (1840–1850). s	R.A. h	$\Delta\alpha_a$ (1840–1850). s
8·0	+0·035	20·0	+0·023
9·0	+0·077	21·0	+0·021
10·0	+0·097	22·0	+0·012
11·0	+0·087	23·0	−0·024

For the N.P.D.s of these Catalogues, the differences have been formed by bringing up the places of the stars which are common to the Catalogues from the 1840 Catalogue, using the proper motions of the 1880 Catalogue, to 1850 and taking the differences, in the sense 1840–1850, between these and the N.P.D.s given in the 1850 Catalogue. These differences have then been arranged in order of N.P.D., and combined, generally, in groups extending each over 5°, and thus the following mean differences formed :—

N.P.D.	Mean Δδ 1840–1850.	Number of Stars.	N.P.D.	Mean Δδ 1840–1850.	Number of Stars.
° ′ 92·41	″ +0·63	13	° ′ 137·54	″ −0·29	128
98·2	+0·63	15	141·55	−0·45	112
103·14	−0·22	25	147·43	−0·71	125
107·14	−0·45	60	152·26	−1·05	85
112·34	+0·02	79	157·39	−1·02	86
117·5	0·00	119	162·38	+0·27	33
122·7	−0·05	132	167·19	+0·19	28
127·24	−0·29	138	173·22	−0·04	12
132·37	−0·65	155			

The total number of stars used in this comparison is 1345. By drawing a reduction curve, in the usual way, and reading off from it, we have :—

N.P.D.	$\Delta\delta_\delta$ (1840–1850).	N.P.D.	$\Delta\delta_\delta$ (1840–1850.)
° 95	″ +0·54	° 135	″ −0·45
100	+0·25	140	−0·44
105	−0·19	145	−0·62
110	−0·20	150	−0·84
115	−0·04	155	−0·85
120	−0·04	160	−0·44
125	−0·19	165	+0·08
130	−0·37	170	+0·10

The differences of N.P.D. of these Catalogues, when arranged in order of R.A. and combined in groups extending each over one hour of R.A., are :—

R.A.	Mean Δδ 1840–1850.	Number of Stars.	R.A.	Mean Δδ 1840–1850.	Number of Stars.
h h	″		h h	″	
0–1	−0·29	28	12–13	−0·60	62
1–2	−0·41	40	13–14	−0·37	62
2–3	−0·46	40	14–15	−0·53	74
3–4	−0·38	69	15–16	−0·94	80
4–5	−0·17	68	16–17	−0·81	69
5–6	−0·07	83	17–18	−0·82	61
6–7	−0·04	99	18–19	−0·27	35
7–8	+0·13	98	19–20	−1·08	16
8–9	−0·28	91	20–21	−0·83	14
9–10	−0·35	64	21–22	−0·20	17
10–11	−0·52	73	22–23	−0·11	17
11–12	−0·53	67	23–24	+0·47	18

The reading of the reduction curve for the beginning of each hour of R.A. has been taken, and +0″·37 applied to each reading to correct for the mean discordance depending on N.P.D. We thus find the following table of discordances depending on R.A. :—

R.A.	$\Delta\delta_\alpha$ (1840–1850).	R.A.	$\Delta\delta_\alpha$ (1840–1850).
h	″	h	″
0·0	+0·37	12·0	−0·18
1·0	+0·13	13·0	−0·13
2·0	−0·07	14·0	−0·15
3·0	−0·05	15·0	−0·33
4·0	+0·09	16·0	−0·46
5·0	+0·24	17·0	−0·42
6·0	+0·33	18·0	−0·26
7·0	+0·36	19·0	−0·26
8·0	+0·28	20·0	−0·26
9·0	+0·08	21·0	−0·17
10·0	−0·07	22·0	+0·20
11·0	−0·15	23·0	+0·42

II. *The Cape Catalogues for* 1840 *and* 1860.

The comparison in N.P.D., when the stars are arranged in order of N.P.D., is given, for these two Catalogues, in *Monthly Notices*, vol. xli. pp. 150, 151.

The differences of R.A., deduced as for the preceding comparisons, arranged in order of N.P.D., and combined in groups extending each over 5° of N.P.D., give the following table :—

N.P.D.	Mean $\Delta\alpha$ 1840-1860.	Number of Stars.	N.P.D.	Mean $\Delta\alpha$ 1840-1860.	Number of Stars.
° ′	s		° ′	s	
39·0	−0·110	3	112·54	−0·016	18
55·4	−0·063	7	117·23	+0·006	48
62·5	+0·001	13	122·34	+0·036	49
68·25	−0·034	22	127·20	+0·024	40
71·56	+0·001	13	132·44	+0·018	56
77·19	−0·004	16	137·31	+0 052	33
82·32	+0·018	23	142·37	−0·009	31
87·9	+0·014	14	147·21	+0·005	32
91·47	+0·039	9	152·29	−0·013	29
98·5	−0·019	14	157·18	+0·015	30
102·30	−0·019	12	165·54	−0·070	20
107·36	+0·017	21	174·14	−0·030	20

The total number of stars used in this comparison is 573.

The reduction curve, constructed in the usual way, gives the following readings :—

N.P.D.	$\Delta\alpha_\delta$ (1840-1860).	N.P.D.	$\Delta\alpha_\delta$ (1840-1860).
°	s	°	°
65	−0·020	120	+0·017
70	−0·012	125	+0·026
75	−0·003	130	+0·027
80	+0·008	135	+0·028
85	+0·019	140	+0·020
90	+0·021	145	+0·002
95	+0·005	150	−0·003
100	−0·008	155	−0·008
105	−0·006	160	−0·023
110	−0·001	165	−0·035
115	+0·001	174·4	−0·030

The differences of R.A., arranged in order of R.A., and combined in groups extending each over one hour of R.A., give the following table :—

R.A.	Mean $\Delta\alpha$ 1840–1860.	Number of Stars.	R.A.	Mean $\Delta\alpha$ 1840–1860.	Number of Stars.
h h	s		h h	s	
0–1	−0·013	19	12–13	+0·039	23
1–2	+0·016	28	13–14	+0·093	19
2–3	−0·022	20	14–15	+0·059	20
3–4	−0·006	22	15–16	+0·007	37
4–5	−0·001	29	16–17	−0·008	25
5–6	−0·020	28	17–18	−0·053	35
6–7	+0·048	23	18–19	−0·017	33
7–8	+0·019	26	19–20	−0·044	20
8–9	+0·016	22	20–21	−0·048	21
9–10	+0·060	22	21–22	−0·014	18
10–11	+0·048	20	22–23	−0·025	23
11–12	+0·024	22	23–24	+0·028	18

Reading off from the reduction curve for the beginning of each hour of R.A., and applying $-0^{s}\cdot005$ to correct for the mean discordance in R.A. depending on N.P.D., we have :—

R.A.	$\Delta\alpha_a$ (1840–1860).	R.A.	$\Delta\alpha_a$ (1840–1860).
h	s	h	s
0·0	0·000	12·0	+0·036
1·0	−0·004	13·0	+0·053
2·0	−0·010	14·0	+0·055
3·0	−0·014	15·0	+0·031
4·0	−0·014	16·0	−0·005
5·0	−0·008	17·0	−0·030
6·0	+0·008	18·0	−0·038
7·0	+0·021	19·0	−0·042
8·0	+0·022	20·0	−0·044
9·0	+0·032	21·0	−0·037
10·0	+0·041	22·0	−0·023
11·0	+0·035	23·0	−0·006

The differences of the N.P.D.s of these two Catalogues when the stars are arranged in order of R.A. and combined in groups extending each over one hour of R.A. are :—

R.A.	Mean Δδ 1840–1860.	Number of Stars.	R.A.	Mean Δδ 1840–1860.	Number of Stars.
h h	"		h h	"	
0–1	−0·25	13	12–13	+0·12	13
1–2	+0·10	20	13–14	+0·35	17
2–3	−0·05	11	14–15	+0·46	13
3–4	−0·19	16	15–16	+0·08	24
4–5	+0·03	23	16–17	−0·23	17
5–6	−0·01	17	17–18	−0·11	21
6–7	+0·08	20	18–19	+0·04	16
7–8	+0·26	19	19–20	−0·13	12
8–9	−0·31	18	20–21	+0·02	9
9–10	−0·05	20	21–22	−0·04	14
10–11	−0·08	24	22–23	+0·10	16
11–12	+0·32	15	23–24	+0·06	13

Applying a correction of −0″·02 for mean discordance in N.P.D. depending upon N.P.D., the reduction curve gives :—

R.A.	$\Delta\delta_a$ (1840–1860).	R.A.	$\Delta\delta_a$ (1840–1860)
h	"	h	"
0·0	−0·07	12·0	+0·20
1·0	−0·07	13·0	+0·28
2·0	−0·05	14·0	+0·32
3·0	−0·10	15·0	−0·21
4·0	−0·10	16·0	−0·05
5·0	−0·03	17·0	−0·14
6·0	+0·06	18·0	−0·10
7·0	+0·07	19·0	−0·07
8·0	−0·05	20·0	−0·07
9·0	−0·15	21·0	−0·04
10·0	−0·10	22·0	+0·01
11·0	+0·09	23·0	0·00

III.—*The Cape Catalogues for* 1850 *and* 1880.

The comparison in R.A. of these two Catalogues, when the stars are arranged in order of N.P.D., is given in *Monthly Notices*, vol. xlv. pp. 298, 299. Using the materials on pp. viii. and ix. of the Introduction to the Cape Catalogue for 1850, where the stars are combined in order of R.A. in groups extending each over 4 hours of R.A., we have the following mean differences :—

R.A.		Mean $\Delta\alpha$ 1850–1880.	Number of Stars.	R.A.		Mean $\Delta\alpha$ 1850–1880.	Number of Stars.
h	m	s		h	m	s	
2	4	+0·049	541	14	19	+0·164	425
6	12	+0·119	673	17	50	+0·078	718
9	40	+0·110	535	21	59	+0·028	476

The correction for mean discordance in R.A. depending on N.P.D. is $-0^{s}\cdot090$, and applying this the reduction curve gives:

R.A. h	$\Delta\alpha_a$ (1850–1880). s	R.A. h	$\Delta\alpha_a$ (1850–1880). s
0·0	−0·055	12·0	+0·046
1·0	−0·050	13·0	+0·057
2·0	−0·042	14·0	+0·072
3·0	−0·021	15·0	+0·058
4·0	−0·002	16·0	+0·035
5·0	+0·014	17·0	+0·013
6·0	+0·028	18·0	−0·004
7·0	+0·027	19·0	−0·023
8·0	+0·025	20·0	−0·040
9·0	+0·022	21·0	−0·056
10·0	+0·022	22·0	−0·063
11·0	+0·033	23·0	−0·059

Again, making use of the materials given in the Introduction to the 1850 Catalogue, and combining the stars arranged in order of N.P.D. in groups of 6°, we have:—

N.P.D.		Mean $\Delta\delta$ 1850–1880.	Number of Stars.	N.P.D.		Mean $\Delta\delta$ 1850–1880.	Number of Stars
°	′	″		°	′	″	
92	55	−0·59	136	141	0	−0·59	328
98	51	−0·47	145	147	1	−0·80	338
104	58	−0·35	117	151	42	−0·35	292
112	5	−0·60	156	158	43	−0·38	193
116	51	−0·50	533	164	46	−0·97	73
122	37	−0·28	404	170	14	−0·65	59
129	4	−0·12	376	176	7	−0·07	5
134	55	−0·33	380				

The total number of stars used in this comparison is 3535. Reading off the differences of N.P.D. from the curve, drawn in the usual manner, gives the following table:—

N.P.D.	$\Delta\delta_\delta$ (1850–1880).	N.P.D.	$\Delta\delta_\delta$ (1850–1880).
°	″	°	″
95	−0.54	135	−0.33
100	−0.43	140	−0.54
105	−0.35	145	−0.69
110	−0.54	150	−0.55
115	−0.56	155	−0.38
120	−0.39	160	−0.44
125	−0.20	165	−0.57
130	−0.13	170	−0.74

From the data on page xiv. of the Introduction to the 1850 Catalogue, where the stars are combined in groups extending each over 4 hours of R.A., the following mean differences are found :—

R.A.		Mean Δδ 1850–1880.	Number of Stars.	R.A.		Mean Δδ 1850–1880.	Number of Stars.
h	m	″		h	m	″	
2	4	−0.29	491	14	19	−0.57	488
6	12	−0.10	635	17	50	−0.66	750
9	40	−0.24	639	21	59	−0.83	532

Reading off from the reduction curve, and applying + 0″.45 for mean discordance in N.P.D., when the stars are arranged in order of N.P.D. we have :—

R.A.	$\Delta\delta_\alpha$ (1850–1880).	R.A.	$\Delta\delta_\alpha$ (1850–1880).
h	″	h	″
0·0	−0.12	12·0	+0.05
1·0	0.00	13·0	−0.03
2·0	+0.15	14·0	−0.10
3·0	+0.20	15·0	−0.13
4·0	+0.26	16·0	−0.16
5·0	+0.31	17·0	−0.18
6·0	+0.34	18·0	−0.22
7·0	+0.33	19·0	−0.25
8·	+0.29	20·0	−0.30
9·0	+0.25	21·0	−0.35
10·0	+0.18	22·0	−0.38
11·0	+0.12	23·0	−0.27

IV.—*The Cape Catalogue for* 1860 *and the Melbourne Catalogue for* 1870.

The R.A.s of the stars which are common to these two Catalogues, as given in the 1860 Catalogue, have been brought up to 1870, using the proper motions of the Cape Catalogue for

1880, and the differences Cape 1860 *minus* Melbourne 1870 taken. These, when arranged in order of N.P.D. and combined in groups extending, generally, over 5° of N.P.D., give the following mean differences:—

N.P.D.	Mean $\Delta\alpha$ 1860-1870.	Number of Stars.	N.P.D.	Mean $\Delta\alpha$ 1860-1870.	Number of Stars.
° ′	s		° ′	s	
48 0	−0·050	5	117 32	−0·001	21
57 13	−0·023	3	122 24	−0·003	12
62 10	+0·005	10	128 6	−0·056	22
67 56	−0·001	9	132 35	−0·010	45
72 14	−0·017	7	137 17	−0·059	31
77 19	+0·022	13	142 52	−0·081	16
82 47	+0·014	13	147 41	−0·056	23
87 20	+0·023	11	152 17	−0·044	29
91 54	−0·013	11	157 18	−0·092	34
97 52	−0·013	8	162 14	−0·026	10
102 39	−0·010	5	167 40	+0·015	15
107 22	+0·022	9	172 11	+0·078	24
112 54	−0·016	8	176 45	+0·187	12

The total number of stars used in this comparison is 406. A curve representing these differences being drawn in the usual manner, the following table is found by reading off from it:—

N.P.D.	$\Delta\alpha_\delta$ (1860-1870).	N.P.D.	$\Delta\alpha_\delta$ (1860-1870).
°	s	°	s
52	−0·038	112	−0·003
56	−0·024	116	−0·005
60	−0·011	120	−0·012
64	−0·004	124	−0·022
68	−0·003	128	−0·032
72	−0·003	132	−0·035
76	+0·006	136	−0·048
80	+0·017	140	−0·063
84	+0·018	144	−0·069
88	+0·009	148	−0·059
92	−0·004	152	−0·058
96	−0·013	156	−0·063
100	−0·010	160	−0·050
104	0·000	164	−0·021
108	+0·004	168	+0·018

The differences in R.A. of these two Catalogues being arranged in order of R.A., and combined in groups extending each over one hour of R.A., give :—

R.A.	Mean $\Delta\alpha$ 1860–1870.	Number of Stars.	R.A.	Mean $\Delta\alpha$ 1860–1870.	Number of Stars.
h h	s		h h	s	
0–1	−0·020	15	12–13	−0·021	17
1–2	−0·031	20	13–14	−0·016	16
2–3	−0·033	12	14–15	−0·008	13
3–4	−0·071	13	15–16	−0·038	20
4–5	−0·056	19	16–17	−0·002	13
5–6	−0·030	17	17–18	+0·026	22
6–7	+0·039	12	18–19	+0·019	24
7–8	+0·012	17	19–20	−0·027	19
8–9	−0·068	20	20–21	−0·056	13
9–10	−0·040	19	21–22	−0·009	17
10–11	+0·041	23	22–23	+0·002	20
11–12	+0·042	10	23–24	−0·029	15

Reading off from the reduction curve for the beginning of each hour of R.A., and applying + 0ˢ·016 to each difference to correct for the mean discordance in R.A. when the stars are arranged in order of N.P.D., we have :—

R.A.	$\Delta\alpha_\alpha$ (1860–1870).	R.A.	$\Delta\alpha_\alpha$ (1860–1870).
h	s	h	s
0·0	−0·007	12·0	+0·028
1·0	−0·011	13·0	+0·005
2·0	−0·017	14·0	−0·002
3·0	−0·034	15·0	−0·005
4·0	−0·041	16·0	+0·002
5·0	−0·022	17·0	+0·025
6·0	+0·015	18·0	+0·033
7·0	+0·023	19·0	+0·011
8·0	−0·004	20·0	−0·017
9·0	−0·019	21·0	−0·014
10·0	+0·016	22·0	+0·005
11·0	+0·051	23·0	+0·004

The mean differences in N.P.D., for groups extending over 5° of N.P.D. arranged in order of N.P.D., have been taken from L. de Ball's paper "Untersuchungen über die eigene Bewegung des

Sonnensystems," page 2, and a reduction curve drawn, the readings from which are as follows:—

N.P.D.	$\Delta\delta_\delta$ (1860-1870).	N.P.D.	δ (1860-1870).
°	″	°	″
64	−0·17	120	+0·52
68	0·00	124	+0·43
72	+0·13	128	+0·42
76	+0·18	132	+0·51
80	+0·22	136	+0·63
84	+0·23	140	+0·65
88	+0·25	144	+0·68
92	+0·28	148	+0·70
96	+0·24	152	+0·70
100	+0·22	156	+0·62
104	+0·24	160	+0·55
108	+0·32	164	+0·47
112	+0·42	168	+0·37
116	+0·52		

The total number of stars used in this comparison is 388. The differences of N.P.D. when the stars are arranged in order of R.A. have been computed directly, and having been combined in groups extending each over one hour of R.A., there results:—

R.A.	Mean $\Delta\delta$ 1860-1870.	Number of Stars.	R.A.	Mean $\Delta\delta$ 1860-1870.	Number of Stars.
h h	″		h h	″	
0–1	+0·48	16	12–13	+0·69	17
1–2	+0·64	21	13–14	−0·04	16
2–3	+1·08	12	14–15	+0·44	13
3–4	+0·64	11	15–16	+0·38	20
4–5	+0·47	19	16–17	+0·10	13
5–6	+0·41	17	17–18	+0·40	22
6–7	+0·28	12	18–19	−0·02	24
7–8	+0·42	17	19–20	+0·10	19
8–9	+0·52	20	20–21	+0·23	14
9–10	+0·75	19	21–22	+0·38	17
10–11	+0·27	23	22–23	+0·65	20
11–12	+0·13	10	23–24	+0·64	15

The total number of stars used is in this case 407. Reading off from the curve and applying $-0''.41$ to correct for the mean discordance in N.P.D., when the stars are arranged in order of N.P.D., leads to the following table:—

R.A.	$\Delta\delta_a$ (1860-1870).	R.A.	$\Delta\delta_a$ (1860-1870).
h	"	h	"
0·0	+0·16	12·0	−0·07
1·0	+0·21	13·0	−0·09
2·0	+0·39	14·0	−0·14
3·0	+0·38	15·0	−0·08
4·0	+0·18	16·0	−0·13
5·0	+0·04	17·0	−0·18
6·0	−0·04	18·0	−0·24
7·0	−0·03	19·0	−0·29
8·0	+0·09	20·0	−0·24
9·0	+0·16	21·0	−0·09
10·0	+0·02	22·0	+0·11
11·0	−0·10	23·0	+0·20

V.—*The Melbourne Catalogue for* 1870 *and the Cape Catalogue for* 1880.

The comparison in R.A. of these two Catalogues, when the stars are arranged in order of N.P.D., is given in *Monthly Notices*, vol. xlv. pp. 300, 301, and the comparison in N.P.D., when the stars are arranged in the same order, in *Monthly Notices*, vol. xlii. pp. 20, 21. For the comparison in R.A., when the stars are arranged in order of R.A. and combined in groups extending each over one hour of R.A., we have:—

R.A.	Mean $\Delta\alpha$ 1870-1880.	Number of Stars.	R.A.	Mean $\Delta\alpha$ 1870-1880.	Number of Stars.
h h	s		h h	s	
0–1	−0·021	38	12–13	−0·002	49
1–2	−0·002	37	13–14	+0·006	42
2–3	+0·034	18	14–15	+0·003	44
3–4	+0·126	33	15–16	−0·039	33
4–5	+0·027	30	16–17	−0·014	41
5–6	+0·026	40	17–18	−0·006	37
6–7	+0·013	29	18–19	+0·037	47
7–8	+0·067	42	19–20	+0·002	36
8–9	+0·090	50	20–21	+0·054	36
9–10	+0·043	41	21–22	−0·055	29
10–11	+0·073	42	22–23	+0·013	46
11–12	+0·007	34	23–24	−0·013	42

Reading off from the reduction curve for the beginning of each hour of R.A., and applying $-0^s.021$ to correct for the mean discordance in R.A. depending on N.P.D., the following table is formed :—

R.A.	$\Delta\alpha_a$ (1870-1880).	R.A.	$\Delta\alpha_a$ (1870-1880).
h	s	h	s
0·0	−0·033	12·0	−0·003
1·0	−0·028	13·0	−0·017
2·0	+0·004	14·0	−0·023
3·0	+0·043	15·0	−0·036
4·0	+0·045	16·0	−0·042
5·0	+0·017	17·0	−0·029
6·0	+0·006	18·0	−0·010
7·0	+0·024	19·0	0·000
8·0	+0·046	20·0	−0·002
9·0	+0·047	21·0	−0·019
10·0	+0·035	22·0	−0·032
11·0	+0·015	23·0	−0·031

Proceeding in exactly the same way with the N.P.D.s arranged in order of R.A., we get the following mean differences :—

R.A.	Mean Δδ 1870-1880.	Number of Stars.	R.A.	Mean Δδ 1870-1880.	Number of Stars.
h h	″		h h	″	
0–1	−0·61	38	12–13	−0·04	50
1–2	−0·56	35	13–14	+0·01	43
2–3	−0·67	18	14–15	−0·57	43
3–4	−0·78	32	15–16	−0·19	33
4–5	−0·79	31	16–17	−0·46	40
5–6	−0·69	40	17–18	−0·47	36
6–7	−0·57	29	18–19	−0·31	48
7–8	−0·10	43	19–20	−0·69	36
8–9	−0·86	50	20–21	−0·52	36
9–10	−0·62	41	21–22	−0·75	29
10–11	−0·17	42	22–23	−0·67	46
11–12	−0·14	34	23–24	−0·86	42

Applying + 0″·50 to correct for the mean discordance in N.P.D. depending on N.P.D., we have finally :—

R.A.	$\Delta\delta_a$ (1870–1880).	R.A.	$\Delta\delta_a$ (1870–1880).
h	"	h	"
0·0	−0·23	12·0	+0·40
1·0	−0·12	13·0	+0·42
2·0	−0·14	14·0	+0·26
3·0	−0·23	15·0	+0·15
4·0	−0·27	16·0	+0·13
5·0	−0·23	17·0	+0·08
6·0	−0·06	18·0	+0·06
7·0	+0·05	19·0	−0·01
8·0	−0·01	20·0	−0·10
9·0	−0·09	21·0	−0·16
10·0	+0·10	22·0	−0·20
11·0	+0·32	23·0	−0·25

Blackheath: May 13, 1886.

On the Proper Motion of Twenty-nine Telescopic Stars.

By J. L. E. Dreyer, Ph.D.

Of late years a considerable number of telescopic stars have been found to have Proper Motion. Not only has Argelander thoroughly investigated 480 stars, the great majority of which are below the sixth magnitude, and deduced the most probable values of their Proper Motions from all published observations of them, but every new Star Catalogue has added to the number of known Proper Motions, while not a few cases casually detected are to be found in the volumes of the *Astronomische Nachrichten*. I propose in this paper to discuss the Proper Motions of twenty-nine stars contained in the Second Armagh Catalogue of 3300 stars, as every contribution to our knowledge of one of the most important departments of Sidereal Astronomy must be of some value.

The Armagh Observations were made in the years 1859 to 1883 with the Mural Circle by Jones, to which in 1862 was added a telescope of seven inches' aperture by the late Mr. Th. Grubb. For further details as regards the instrument, the observations and their reduction, I may refer to the Catalogue itself, which I hope will be distributed in a few weeks. The working list was formed by selecting suitable stars from Baily's Lalande, which were supposed not to have been lately reobserved elsewhere. The mean places for 1875 resulting from the Armagh